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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/065,219	09/26/2002	Jose I. Arno	ATMI-506	9419
25559	7590	07/28/2004	EXAMINER	
ATMI, INC. 7 COMMERCE DRIVE DANBURY, CT 06810			WONG, EDNA	
			ART UNIT	PAPER NUMBER

1753
DATE MAILED: 07/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/065,219

Applicant(s)

ARNO ET AL.

Examiner

Edna Wong

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2004.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 32-46, 48-53, 55-62 and 66-73 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☒ Claim(s) 32-46, 48-53, 56-60, 66-71 and 73 is/are allowed.
6) ☒ Claim(s) 55, 61 and 72 is/are rejected.
7) ☒ Claim(s) 62 is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 07 July 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

This is in response to the Amendment dated July 7, 2004. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Response to Arguments

Drawings

The drawings were received on July 7, 2004. These drawings are objected to by the Examiner.

Claim Rejections - 35 USC § 102

I. Claims **32-35, 38, 41-42, 46, 48-49, 51 and 57** have been rejected under 35 U.S.C. 102(b) as being anticipated by **JP 2001-189273** ('273).

The rejection of claims 32-35, 38, 41-42, 46, 48-49, 51 and 57 under 35 U.S.C. 102(b) as being anticipated by JP 2001-189273 has been withdrawn in view of Applicants' amendment.

II. Claim **61** has been rejected under 35 U.S.C. 102(b) as being anticipated by **JP 2001-189273** ('273).

The rejection of claim 61 under 35 U.S.C. 102(b) as being anticipated by JP 2001-189273 has been withdrawn in view of Applicants' amendment.

III. Claims **32-33, 38, 46 and 57** have been rejected under 35 U.S.C. 102(a) as being anticipated by **JP 2001-267241** ('241).

The rejection of claims 32-33, 38, 46 and 57 under 35 U.S.C. 102(a) as being anticipated by JP 2001-267241 has been withdrawn in view of Applicants' amendment.

Claim Rejections - 35 USC § 103

I. Claims **36-37, 39-40, 43-45, 50, 52-53 and 58** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **JP 2001-189273** ('273) as applied to claims 32-35, 38, 41-42, 46, 48-49, 51 and 57 above.

The rejection of claims 36-37, 39-40, 43-45, 50, 52-53 and 58 under 35 U.S.C. 103(a) as being unpatentable over JP 2001-189273 ('273) as applied to claims 32-35, 38, 41-42, 46, 48-49, 51 and 57 above has been withdrawn in view of Applicants' amendment.

II. Claim **62** has been rejected under 35 U.S.C. 103(a) as being unpatentable over **JP 2001-189273** ('273).

The rejection of claim 62 under 35 U.S.C. 103(a) as being unpatentable over JP 2001-189273 ('273) has been withdrawn in view of Applicants' amendment.

III. Claims **39-45, 48-53 and 58** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **JP 2001-267241** ('241) as applied to claims 32-33, 38 and 46 above.

The rejection of claims 39-45, 48-53 and 58 under 35 U.S.C. 103(a) as being unpatentable over JP 2001-267241 ('241) as applied to claims 32-33, 38 and 46 above has been withdrawn in view of Applicants' amendment.

IV. Claims **36-37, 39-40, 43-45, 50, 52-53 and 58** have been rejected under 35 U.S.C. 103(a) as being unpatentable over **JP 2001-189273** ('273) as applied to claims 32-35, 38, 41-42, 46, 48-49, 51 and 57 above.

The rejection of claims 36-37, 39-40, 43-45, 50, 52-53 and 58 under 35 U.S.C. 103(a) as being unpatentable over JP 2001-189273 ('273) as applied to claims 32-35, 38, 41-42, 46, 48-49, 51 and 57 above has been withdrawn in view of Applicants' amendment.

V. Claim **62** has been rejected under 35 U.S.C. 103(a) as being unpatentable over **JP 2001-189273** ('273).

The rejection of claim 62 under 35 U.S.C. 103(a) as being unpatentable over JP 2001-189273 ('273) has been withdrawn in view of Applicants' amendment.

VI. Claim **69** is rejected under 35 U.S.C. 103(a) as being unpatentable over **JP 2001-267241** ('241).

The rejection of claim 69 under 35 U.S.C. 103(a) as being unpatentable over JP 2001-267241 ('241) has been withdrawn in view of Applicants' amendment.

Response to Amendment

Drawings

The drawings are objected to because Fig. 2 contains new matter. Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Applicants' specification discloses that:

"A diluent gas source **32** is also provided for supplying relatively inert gas, such as Ar, He, or N, to dilute the F radicals and/or XF_n compounds delivered into the processing chamber **54**. Such diluent gas source **32** is controlled by a flow control valve **26** as well as a mass flow controller **56**. Diluent gas will effectively reduce reaction rates between the F radicals and/or XF_n compounds and the solid residues in the processing chamber **54**, so as to avoid sudden pressure increase inside the

processing chamber **54.**" (page 14, [0098]).

It appears from Applicants' specification (page 14, [0098]; and original Fig. 2) that the inert gas is supplied from the diluent gas source connected to the semiconductor processing chamber and not connected to the holding chamber.

Thus, Fig. 2 contains new matter.

Claim Objections

Claims **61 and 62** are objected to because of the following informalities:

Claim 61

line 9, it is suggested that the word "such" be amended to the word -- the --.

Claim 62

line 7, it is suggested that the word "such" be amended to the word -- the --.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

I. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims **61 and 72** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter

which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification, while being supporting for supplying inert gas from the diluent gas source connected to the semiconductor processing chamber, does not reasonably provide support for supplying inert gas from the diluent gas source connected to the holding chamber.

Claim 61, lines 12-13, and claim 72, lines 1-2, recite "supplying an inert gas from the/a diluent gas source connected with the holding chamber." Applicants' specification discloses that:

"A diluent gas source **32** is also provided for supplying relatively inert gas, such as Ar, He, or N₂, to dilute the F radicals and/or XF_n compounds delivered into the processing chamber **54**. Such diluent gas source **32** is controlled by a flow control valve **26** as well as a mass flow controller **56**. Diluent gas will effectively reduce reaction rates between the F radicals and/or XF_n compounds and the solid residues in the processing chamber **54**, so as to avoid sudden pressure increase inside the processing chamber **54**." (page 14, [0098]).

It appears from Applicants' specification (page 14, [0098]; and original Fig. 2). that the inert gas is supplied from the diluent gas source connected to the semiconductor processing chamber and not connected to the holding chamber.

Thus, these claims contain new matter.

II. Claim **55** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant

regards as the invention.

Claim 55

line 19, "fluorine-containing interhalogen compound" (singular) lacks antecedent basis.

Allowable Subject Matter

The following is a statement of reasons for the indication of allowable subject matter:

Claims **32-46, 48-53, 56-60 and 72-73** define over the prior art of record because the prior art does not teach or suggest a method for *in-situ* generation of fluorine radicals and/or fluorine-containing interhalogen compounds for use in cleaning a semiconductor processing chamber, comprising the steps of (a) providing and (b) providing as presently claimed, esp., wherein said method is characterized by at least one of the sequences (I), (II) and (III) as presently claimed.

Claim **55** defines over the prior art of record because the prior art does not teach or suggest a method for *in-situ* generation of fluorine radicals and/or fluorine-containing interhalogen compounds for use in cleaning a semiconductor processing chamber, comprising the steps of (a) providing, (b) providing, (c) flowing, (d) generating, (e) flowing and (f) flowing as presently claimed, esp., the steps of (e) flowing the generated fluorine radicals and/or fluorine-containing interhalogen compounds from the mixing chamber into a holding chamber for storage until a pre-determined pressure threshold is

reached and (f) flowing the generated fluorine radicals and/or fluorine-containing interhalogen compounds from the holding chamber into the semiconductor processing chamber to effect cleaning therein, wherein the flow rate of the formed fluorine radicals and/or fluorine-containing interhalogen compound from the holding chamber into the semiconductor processing chamber is monitored and controlled.

Claim **61** defines over the prior art of record because the prior art does not teach or suggest a method of generating chlorine trifluoride, for cleaning of a semiconductor processing chamber, said method comprising the steps of (a) providing, (b) providing, (c) providing, (d) mixing, (e) supplying, (f) flowing, (g) supplying and (h) flowing as presently claimed, esp., the steps of (f) flowing generated chlorine trifluoride into a holding chamber for storage until a pre-determined pressure threshold is reached, (g) supplying an inert gas from the diluent gas source connected with the holding chamber to dilute the generated chlorine trifluoride and (h) flowing diluted chlorine trifluoride from the holding chamber into the semiconductor processing chamber to effect cleaning therein.

Claim **62** defines over the prior art of record because the prior art does not teach or suggest a method for generating chlorine trifluoride, comprising the steps of (a) providing, (b) providing, (c) flowing and (d) supplying as presently claimed, esp., the steps of (c) flowing fluorine gas and chlorine gas from said gas sources into a semiconductor processing chamber; and (d) supplying photoenergy to said processing chamber from a photoenergy source to facilitate generation of chlorine trifluoride in such

semiconductor processing chamber.

Claims **66-68** define over the prior art of record because the prior art does not teach or suggest a method for generating fluorine radicals and/or fluorine-containing interhalogen compounds, comprising the steps of (i) providing, (ii) providing, (iii) providing, (iv) mixing, (v) supplying and (vi) supplying as presently claimed, esp., the steps of (v) supplying photoenergy to said enclosure from a photoenergy source to facilitate generation of the fluorine radicals and/or fluorine-containing interhalogen compounds and (vi) supplying the inert gas to the enclosure to dilute the generated fluorine radicals and/or fluorine-containing interhalogen compounds.

Claims **69-71** define over the prior art of record because the prior art does not teach or suggest a method for *in-situ* generation of fluorine radicals and/or fluorine-containing interhalogen compounds for use in cleaning a semiconductor processing chamber, comprising the steps of (a) providing, (b) providing, (c) providing, (d) flowing, (e) generating, (f) flowing and (g) flowing, esp., the step of (g) flowing the diluent gas into the semiconductor processing chamber to dilute the fluorine radicals and/or fluorine-containing interhalogen compounds contained therein.

The prior art does not contain any language that teaches or suggests the above. Therefore, a person skilled in the art would not have been motivated to adopt the above conditions, and a *prima facie* case of obviousness cannot be established.

Claim 55 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

Claim 61 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, first paragraph, set forth in this Office action.

Claim 62 would be allowable if rewritten or amended to overcome the claim objection set forth in this Office action.

Claim 72 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, first paragraph, set forth in this Office action.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

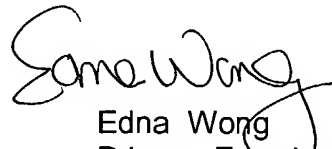
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Edna Wong whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 3:30 pm, Flex Schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Edna Wong
Primary Examiner
Art Unit 1753

EW
July 25, 2004